



## **TROPOSPHERE-STRATOSPHERE CHANGES INDUCED BY VOLCANIC AEROSOL**

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The global UM model in a coupled to ocean configuration has been used to simulate the response to lower stratospheric aerosol. Aerosol optical depths, based on the reconstruction of Sato et al. (JGR, 1993) have been inserted in the above-tropopause level, representing the period from December 1990 to February 1992. The mechanisms of induced changes to the stratosphere-troposphere system dynamics and interactions are analysed through energy conversion diagnostics. A particular response is emphasised in the conversion of the diabatic supply, towards the mean stratospheric flow budget, leading to acceleration by an additional stratospheric circulation, with distinct features noticed in summer respectively winter. In both cases the entrance area to the stratosphere, is about the edge of the Hadley cell, with a return circulation at about 10 hPa and about five days pulsation frequency.

A simple linear 3D PE model is used to account for the non-interactive wave response to a similar thermal dipolar forcing at the tropopause. We show that the perturbation creates necessary conditions of increased wave propagation in a neighbouring layer, where the adjustment to the dipole forcing is done through a folding layer. This propagation as well as the vertical extension of this layer are shown to be controlled by second order variations of the static stability. The linear study together with energy diagnostics of GCM simulation, sustain the idea of mainly barotropic use of the tropospheric supply through planetary wave propagation to produce the accelerated stratospheric circulation. Transience seems to characterise this mechanism as shown in the pulsation frequency of accelerated circulation streamlines.